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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,407	08/21/2001	Cary Lee Bates	ROC9200110085US1	8109

7590 08/04/2004

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EXAMINER	
YIGDALL, MICHAEL J	

ART UNIT	PAPER NUMBER
2122	

DATE MAILED: 08/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,407	BATES ET AL.	
	Examiner	Art Unit	
	Michael J. Yigdall	2122	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/21/2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-26 are pending and have been examined. The priority date considered for the application is August 21, 2001.

Specification

2. The disclosure is objected to because of the following informalities: The brief description of Figure 3 (see paragraph 15) states, "Figure 3 illustrates a Control Dependence Graph (CFG)." The acronym "CFG" was perhaps intended to read --CDG-- instead. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,263,489 to Olsen et al. (hereinafter "Olsen") in view of U.S. Pat. No. 6,161,216 to Shagam (hereinafter "Shagam").

With respect to claim 1, Olsen discloses a method for inserting breakpoints in a program being debugged (see the abstract), comprising:

(a) identifying a statement for the program being debugged (see column 12, lines 33-39, which shows identifying a statement);

(b) determining which basic block contains the statement (see column 12, lines 28-32, which shows determining the basic block from which the statement is identified);

(c) determining which blocks control execution of the basic block (see column 12, lines 40-45, which shows determining the blocks in the path of execution of the basic block).

Although Olsen discloses inserting commit points for all possible breakpoint locations (see column 8, lines 37-42) and determining exit points for the basic blocks (see column 10, lines 17-25), Olsen does not expressly disclose:

(d) inserting a breakpoint at each branch contained in the blocks controlling execution of the basic block.

However, Shagam discloses inserting trace points at every block of execution (see column 6, lines 23-28). Control flow statements, i.e. branches, bound each block (see column 2, lines 9-31), and thus the trace points are inserted at every branch. The trace points are analogous to breakpoints (see column 1, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve the performance and accuracy of Olsen's debugging method by inserting a breakpoint at each branch, as taught by Shagam (see column 1, lines 29-36 and 57-62), within the blocks in the path of execution of the basic block.

With respect to claim 2, Olsen further discloses the limitation wherein the statement is the location where the program being debugged halted execution (see column 13, lines 13-20, which shows identifying the instruction or statement at which the program suspended or halted execution).

With respect to claim 3, Olsen further discloses the limitation wherein the blocks controlling execution of the basic block are blocks on which the basic block is control dependent (see column 5, line 46 to column 6, line 12, which shows that blocks in the path of execution of the basic block are dependent upon control flow).

With respect to claim 4, Olsen further discloses the limitation wherein identifying the statement comprises identifying a statement that may modify a program variable (see column 7, lines 1-11, which shows identifying statements that may modify a variable).

With respect to claim 5, Olsen further discloses the limitation wherein identifying the statement that may modify a program variable comprises accessing a table comprising the variable mapped to statements that may modify the variable (see column 6, lines 55-67, which shows a range table for mapping the variable to statements that may modify the variable).

With respect to claim 6, Olsen further discloses the limitation wherein identifying the statement comprises identifying statements associated with loop latches (see column 13, lines 48-60, which shows identifying statements associated with loops).

With respect to claim 7, Olsen further discloses the limitation wherein identifying statements associated with loop latches comprises accessing tables comprising the basic block mapped to the loop latches (see column 8, lines 51-61, which shows a table for mapping source loops to basic blocks in the machine code).

With respect to claim 8, Olsen further discloses the limitation wherein identifying the statement comprises identifying a currently executing statement of each of a plurality of

subprograms (see column 7, lines 15-47, which shows identifying and executing statements of a plurality of functions, i.e. subprograms).

With respect to claim 9, Olsen further discloses the limitation wherein each of the plurality of subprograms is a portion of the program being debugged and performs a specific task (see column 7, lines 15-47, which shows that the functions or subprograms in the program are debugged, and that the functions change the state of the program, i.e. perform a task).

With respect to claim 10, Olsen further discloses the limitation wherein identifying the currently executing statement comprises accessing a table comprising the plurality of subprograms mapped to its respective currently executing statement (see column 8, lines 43-50, which shows a table for mapping source constructs, e.g. subprograms, to machine code instructions that are executed).

With respect to claim 11, Olsen further discloses the limitation wherein the blocks controlling execution of the basic block are blocks on which the basic block is control dependent (see column 5, line 46 to column 6, line 12, which shows that blocks in the path of execution of the basic block are dependent upon control flow).

With respect to claim 12, Olsen discloses a computer system comprising at least one processor configured to execute a debugging program (see CPU 12 and debugger 30 of computer system 10 in FIG. 1), wherein the processor, when executing the debugging program, is configured to perform an operation (see the abstract) comprising:

(a) identifying a statement for the program being debugged (see column 12, lines 33-39, which shows identifying a statement);

(b) determining which basic block contains the statement (see column 12, lines 28-32, which shows determining the basic block from which the statement is identified);

(c) determining which blocks control execution of the basic block (see column 12, lines 40-45, which shows determining the blocks in the path of execution of the basic block).

Although Olsen discloses inserting commit points for all possible breakpoint locations (see column 8, lines 37-42) and determining exit points for the basic blocks (see column 10, lines 17-25), Olsen does not expressly disclose:

(d) inserting a breakpoint at each branch contained in the blocks controlling execution of the basic block.

However, Shagam discloses inserting trace points at every block of execution (see column 6, lines 23-28). Control flow statements, i.e. branches, bound each block (see column 2, lines 9-31), and thus the trace points are inserted at every branch. The trace points are analogous to breakpoints (see column 1, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve the performance and accuracy of Olsen's debugging method by inserting a breakpoint at each branch, as taught by Shagam (see column 1, lines 29-36 and 57-62), within the blocks in the path of execution of the basic block.

With respect to claim 13, Olsen further discloses the limitation wherein identifying the statement comprises:

(a) identifying a program variable (see column 6, lines 55-67, which shows identifying a variable); and

(b) determining which statements may modify the variable (see column 7, lines 1-11, which shows determining statements that may modify the variable).

With respect to claim 14, Olsen further discloses the limitation wherein identifying the statement comprises:

(a) determining a plurality of sets of loop latches for the basic block (see column 8, lines 51-61, which shows determining a plurality of loops associated with basic blocks in the machine code); and

(b) identifying the statements associated with loop latches (see column 13, lines 48-60, which shows identifying statements associated with loops).

With respect to claim 15, Olsen further discloses the limitation wherein identifying the statement comprises identifying a currently executing statement of a plurality of subprograms (see column 7, lines 15-47, which shows identifying and executing statements of a plurality of functions, i.e. subprograms).

With respect to claim 16, Olsen discloses a signal-bearing medium (see medium 36 in FIG. 1), comprising a program (see debugger 30 in FIG. 1) which, when executed by a processor (see CPU 12 in FIG. 1), performs an operation (see the abstract), comprising:

(a) identifying a statement for the program being debugged (see column 12, lines 33-39, which shows identifying a statement);

(b) determining which basic block contains the statement (see column 12, lines 28-32, which shows determining the basic block from which the statement is identified);

(c) determining which blocks control execution of the basic block (see column 12, lines 40-45, which shows determining the blocks in the path of execution of the basic block).

Although Olsen discloses inserting commit points for all possible breakpoint locations (see column 8, lines 37-42) and determining exit points for the basic blocks (see column 10, lines 17-25), Olsen does not expressly disclose:

(d) inserting a breakpoint at each branch contained in the blocks controlling execution of the basic block.

However, Shagam discloses inserting trace points at every block of execution (see column 6, lines 23-28). Control flow statements, i.e. branches, bound each block (see column 2, lines 9-31), and thus the trace points are inserted at every branch. The trace points are analogous to breakpoints (see column 1, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve the performance and accuracy of Olsen's debugging method by inserting a breakpoint at each branch, as taught by Shagam (see column 1, lines 29-36 and 57-62), within the blocks in the path of execution of the basic block.

With respect to claim 17, the limitations recited in the claim are analogous to those of claim 2 (see the explanation for claim 2 set forth above).

With respect to claim 18, the limitations recited in the claim are analogous to those of claim 3 (see the explanation for claim 3 set forth above).

With respect to claim 19, the limitations recited in the claim are analogous to those of claim 4 (see the explanation for claim 4 set forth above).

With respect to claim 20, the limitations recited in the claim are analogous to those of claim 5 (see the explanation for claim 5 set forth above).

With respect to claim 21, the limitations recited in the claim are analogous to those of claim 6 (see the explanation for claim 6 set forth above).

With respect to claim 22, the limitations recited in the claim are analogous to those of claim 7 (see the explanation for claim 7 set forth above).

With respect to claim 23, the limitations recited in the claim are analogous to those of claim 8 (see the explanation for claim 8 set forth above).

With respect to claim 24, the limitations recited in the claim are analogous to those of claim 9 (see the explanation for claim 9 set forth above).

With respect to claim 25, the limitations recited in the claim are analogous to those of claim 10 (see the explanation for claim 10 set forth above).

With respect to claim 26, the limitations recited in the claim are analogous to those of claim 11 (see the explanation for claim 11 set forth above).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. No. 5,790,858 to Vogel discloses a method and system for selecting instrumentation points, i.e. breakpoints, in a computer program based on the flow of control among the basic blocks.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Yigdall whose telephone number is (703) 305-0352. The examiner can normally be reached on Monday through Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (703) 305-4552. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MY

Michael J. Yigdall
Examiner
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mjy

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PRIMARY EXAMINER